

Picoprojection – New Era Display Application

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Information Era Has Come

- Mobility enabled by portable devices
 - Mobile phone, PDA, MP4, PMP, GPS, Notebook PC, Digital camera, etc



Information Era Has Come

- Higher communication bandwidth enables more information delivered
- Requires higher resolution displays to enable – mobile web browsing, GPS, mobile TV, etc...
- Mobile phone displays evolution
 - 2005 1.8" QCIF, 2.4" 2006 QVGA, ..., 3.2"-3.5" 2008 VGA...



Problem Today

Dilemma

Higher information content

- > bigger display - more bulky device
- > smaller pixel - more difficult to read

Mobile Experience Tomorrow – Wish List

- Mobile Big/Variable Screen Experience
- Portable High Resolution
- Sharing



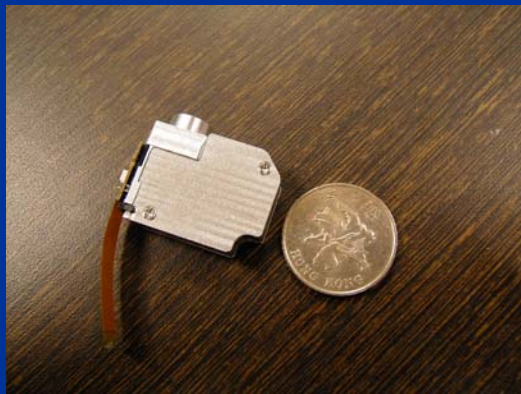
Unique Solution?

Picoprojection



Enabling Technology

- Picoprojection Module – Bill of Materials
 - Display panel or MEMS scanner
 - Liquid Crystal on Silicon (LCoS) or TFT
 - Digital Light Processing (DLP) micro-mirror array
 - Single MEMS scanning mirror

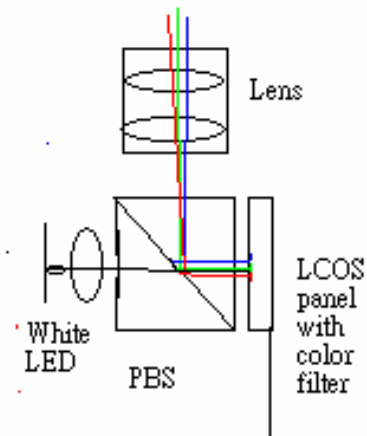


Picoprojector Module BOM

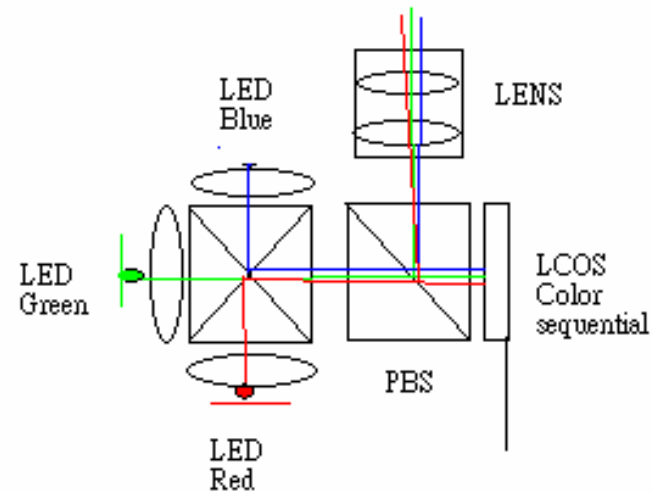
- Light source
 - LED
 - Laser
- Projection lens (non-MEMS type)
- Color combining optics



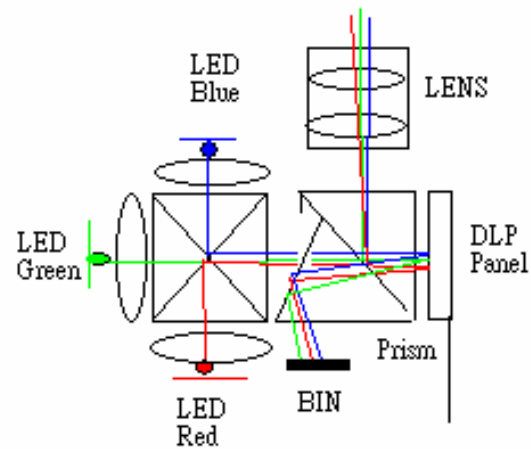
LCoS Based Picoprojection (Color Filter Type)



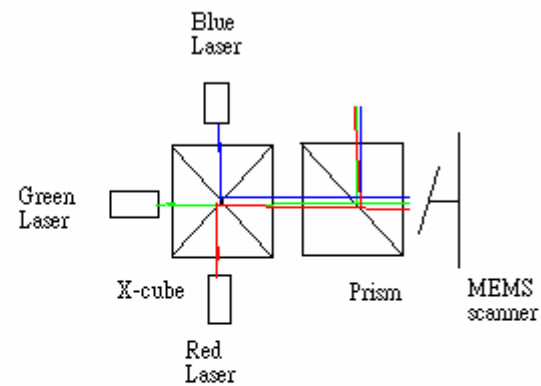
LCOS Based Picoprojection (Color Sequential Type)



DLP Based Picoprojection



Scanning MEMS Mirror Based Picoprojection



Technical Challenge

- LCoS or TFT LCD Based Picoprojector
 - Polarization loss
 - Etendue of LED and optical system
- DLP Based Picoprojector
 - Power consumption
 - Etendue and LED and optical system
- MEMS scanning mirror Based Picoprojector
 - Availability of laser, cost, speckle, efficiency, and safety

Key is “Striking balance between cost, size, lumen output, and power consumption”

Picoprojection Application

- Companion picoprojectors
 - For connection to devices such as mobile phones, notebook PC, iPod, MPEG4, game consoles, DV, DC

“Interface availability today: CVBS video, VGA, USB, HDMI

Interface tomorrow: Wireless USB, DisplayPort”

Companion Picoprojectors



Companion Picoprojector Available Today

- SUGA IPL610S LCoS picoprojector
 - Gold award winner – Portable Electronics, Hong Kong Electronics Fair 2008



Companion Picoprojector Available Today

- 3M MPro 110 LCoS Picoprojector



Companion Picoprojector Available Today

- Optoma DLP Picoprojector



“Toshiba new DLP model is coming soon”



Companion Picoprojector Available Today

- Aiptek V10 PocketCinema LCoS Picoprojector



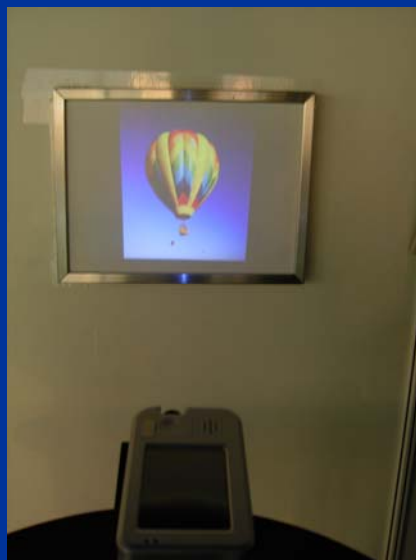
Embedded Picoprojector

- For embedding into notebook PC, mobile phone, DV, PMP, etc



Embedded Picoprojection Available Today

- SuniView PMPP (Portable Media Player with Projector)
 - World's first embedded picoprojector
 - Window CE 5.0 with mobile Office



Embedded Picoprojection Available Today

- C-King mobilephone with picoprojector
- World's first commercially available mobile phone with projector

“Bigger players like Nokia, Samsung, Sony Ericsson, Motorola, Docomo, etc. all keeping their eyes on it – Some already working on it



Market Forecast

- Insight Media
 - 2009 – 3.1Mpc
 - 2010 – 9.1Mpc
 - 2011 – 19Mpc
 - 2012 – 31.5Mpc
- 2010 more than 1.5% of mobile phone has embedded projector totaling 18Mpc
- Yole – Embedded projector would be majority among all projectors

“Picoprojector – Driving projector usage from office/home to individual”

THANK YOU

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